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Thirty-two deaf retarded patients were diagnostically assessed for speech and hearing, intellectual function, academic achievement, and medical status. Eight of the patients served as controls and 24 received 18 to 24 months of special training in communication skills, shop experience, physical education, and homemaking. Twelve of the 24 also received psychotherapy. Formal vocational training in a sheltered workshop for males and participation in the institution work program and community vocational placement for both sexes were initiated during the final year of the program. As a result of the program, some of the patients were able to be discharged or to be placed in the community on a day basis. Others were able to participate in the institutional work program. Communication, intellectual functioning, and social/personal adjustment improved significantly ($p < .02$ or $p < .02$), but academic achievement did not improve. The psychotherapy program was not shown statistically to be effective; in fact, the subjects without psychotherapy improved more in intellectual function and performance. The patients participated successfully in the sheltered workshop. (EC)

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**PROGRAMMING HABILITATION
OF THE
HOSPITALIZED DEAF - RETARDED**

**Research Report Number 44
Department of Mental Health
Lansing, Michigan**

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Department of Mental Health
Lansing, Michigan
September, 1965

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RESULTS OF A PROGRAM FOR THE HABILITATION OF THE HOSPITALIZED DEAF-RETARDED PATIENT

A REVIEW

This review is a summary of a four-year project to study habilitation of the deaf-retarded which was carried out at Lapeer State Home and Training School in Michigan and was supported in part by Vocational Rehabilitation Grant RD800 S.

The sense of the study report is that deaf-retarded patients can be habilitated in a number of ways. The result of the project is that a specialized program for deaf-retarded patients has become an integral part of the institution's overall program. The meat of the analysis is that education, psychotherapy and vocational training have important contributions to make to habilitation.

The expectation for the future is that with further experience it will be possible to increase the specificity and the effectiveness of the habilitation programs and that with additional information, begun in this project, pre-selection of patients for particular kinds of training and vocational placement will be more efficient.

Any reader seriously interested in the evidence is referred to the full report. This review summarizes the study for those who are contemplating a program with similar goals in order that they may have a set of guidelines based on the experience of one four-year experimental program. The success, problems and failure of the program can perhaps best be brought into focus if such guidelines are made available without the details and qualifications which necessarily shroud the development of the complete discussion of the program given in the final report. In this faith a series of assertions are offered here. Their validity can be checked in most instances by study of the full report. The validity of others will depend on their rationality as the reader considers it in relation to his own planning. First, a brief description of the project.

Project Description

This was a four-year project to identify and assess the characteristics of deaf-retarded patients institutionalized in the Michigan state system of institutions for the retarded; develop and apply a training program for a selected population of these deaf-retarded patients; provide vocational experience appropriate to their trained potential; and to evaluate the effects of each part of the program in an objective way yielding information for future programming.

The project began with a thorough diagnostic assessment of patients referred from the state institutions, in terms of their intellectual and personal-social characteristics, academic achievement and hearing defects. At the beginning of the second year, a sample of twenty-four deaf or hard-of-hearing patients was selected to participate in a special training program and eight similar patients were selected to serve as a control group for comparison when effectiveness of

various parts of the program was studied. For eighteen months the twenty-four patients assigned to classes on the basis of academic competence were given instruction in communication, academic subjects and pre-vocational programs including shop, physical education and homemaking. Twelve of these patients also participated in an additional program of psychotherapy. During the final year of the project, formal vocational training was begun in the form of a sheltered workshop for males and participation in the institution work program and community vocational placements for both sexes.

General Observations

(1) It is well to formulate a program of this kind precisely in terms of its particular goals in direct relation to the types of patients to be included. Following this, the limiting conditions under which these goals can be achieved should be carefully studied and it should be determined which of these exist or can be established in the institution setting. When a realistic compromise between required and available conditions has been achieved and goals redefined in terms of this compromise, the actual mechanisms for goal achievement with the patients can be specified. The larger this list of mechanisms, the greater the likelihood of program success because not only the setting but also experience with the patients will dictate changes in particular mechanisms initially selected. Examples of this are given throughout the full report.

(2) The consultants and the staff brought into the institution for the new program may be identified as outsiders whose interests and aspirations are determined by ideals of their respective professions rather than by the local rules and mores. They are likely to see themselves as mobile and are likely to be impatient with the rest of the institution staff's concern for the integrity of the present functioning of the institution. The local defense will encapsulate and thereby severely limit the effective operation of the program if it becomes defined as a special project, especially if it has an independent budget. One solution to this problem is assignment of staff members to the appropriate departments in the institution so that the special aspects of the new program become extensions of ongoing programs within the institution network. For example, teachers are assigned to the school program, psychologists to the psychology department and workshop supervisor to the work program.

(3) Specialists who serve as consultants are useful extensions of the project staff but the staff, not the consultants, should determine the program goals and this delineation of function should be made both explicit and specific. Staff must evaluate consultants' suggestions in the context of the total institution program as well as the particular program. While this appears to be a gratuitous statement, in practice, in part because of problems of obtaining full-time staff, it is remarkably easy to let the planning fall into the province of the "experts" with a consequent loss of direction at the program level.

(4) Careful study of legal requirements related to job placement and payment for service should accompany program planning since they directly influence the

conditions under which vocational training and placement can be carried out. In fact, failure to resolve these seemingly minor problems in advance can defeat the ultimate purpose of the program.

(5) Advance reading of the literature and employment of knowledgeable staff with experience not only in the substantive area of the deaf and retarded but also in institutional settings are all obvious but sometimes ignored rules.

Observations for Staff Selection

(1) The minimal staff for a project of this scope includes special education teachers preferably with experience with the retarded and certainly with the deaf; a speech and hearing therapist prepared in audiological testing; a person to handle work placement and supervision and to locate positions in the community and piecework for the workshop; a workshop supervisor; psychotherapists preferably with experience with the deaf and if possible with the retarded.

(2) Use of sign language is very important to the success of a program and at least those persons who are to conduct the formal education including the communication training should have this ability. Other staff members working with the patients should be taught signing at the outset.

(3) It appears that the most effective supervisor of a sheltered workshop is a congenial person with mechanical talent, extensive patience and an interest in retarded patients. He should not be expected to locate the piecework nor to handle placements of patients in the community.

(4) Psychotherapists will be almost impossible to locate because the short supply is further reduced by the severe limitations of the retarded complicated by inability to communicate verbally - the sine qua non of most psychotherapy. Therapists will probably be most readily found among the psychologists at the institution who can vary their activities to include a sample of deaf-retarded patients for the theoretical interest they provide. There is the possibility, of course, that a deaf therapist can be located to carry a complete caseload of deaf-retarded.

(5) Staff salaries should reflect the salary schedule of the institution and benefits of employment offered by that institution. This is sometimes a problem where funding by federal or other grant which promises no tenure. The best solution appears to be to provide employment benefits and tenure since most systems can absorb professional staff through normal turnover.

Major Results and Program Suggestions

(1) As a result of this project which provided a wide range of experience and training, it was possible to discharge some patients and place others in the open community during the day. This group had been hospitalized for a mean of eleven and one-half years and would doubtless not have left the institution without this or similar intervention. No control patients had this moving out experience although

those decisions were not made by the project staff. An additional group of patients were able, following training, to participate in the institution work program and yet another group learned to perform productively in the sheltered workshop created for the project.

(2) The pre-vocational (i.e., education) program which focused on training in communication, reading, arithmetic and shop or homemaking was effective in several ways although apparently ineffective in terms of academic achievement as measured by standardized tests. Communication, intellectual functioning and social-personal adjustment all improved significantly during the course of training. Academic achievement improved less than one grade level during the eighteen-month education program and measured at approximately the second grade level both before and after training.

It was concluded that small classes of approximately eight patients very similar in level of achievement are most effectively handled. The need for similarity of competence requires three levels of class and these classes are best taught by one teacher rather than by some form of teacher rotation.

(3) Psychotherapy, broadly defined here as activity with patients which focuses on inter-personal conflicts, is a productive part of the training program. This assertion is not proved conclusively by the data given in the full report but the available data reflected against clinical theory gives strong support to the assertion. There was evidence that personality changes were generated in the course of therapy and these changes were reflections of a move toward more active coping behavior, lowering depression and general reconstruction of personality which would, in the long run, lead to more pervasive and lasting improvement in achievement and intellectual function than for patients who did not get therapy. Nevertheless, at the close of the project the group of patients who participated in the education program but did not receive psychotherapy had shown a more marked improvement in intellectual function and performance than the psychotherapy patients.

(4) The number of deaf-retarded patients rehabilitated to the extent of placement in working situations off the grounds of the institution will be limited regardless of success of the program of training. This is especially likely unless extensive efforts are made to locate positions and to provide supervision of the patients in the working situation. The extent of retardation is the most significant determiner of success in placing such patients but deafness and inability to communicate make it more difficult. The work placements which are most likely to be successful are those in which a larger group of retardates are participating, some of whom are not deaf, and who can be observed performing the work upon direction or in single placements where close supervision and patient instruction are available.

(5) Deaf and retarded patients can and do work successfully in a sheltered workshop setting. They can maintain interest in routine assembly and repair tasks for several hours and are able to produce quality work in adequate volume at this level.

It is economically feasible for industries which have such piecework available to employ deaf retardates to do it in a workshop setting on the institution grounds.

(6) These patients should be domiciled in a cottage with their peers where programs can be carried on which enrich the impact of education and psychotherapy and where their entire living experience can reinforce their socialization and communication skills.

(7) Location of retarded patients who may be deaf requires some initial screening by qualified staff because often deafness will not be differentiated from retardation by attendants and others at the institution. About one-fourth of the patients identified as deaf and treated as deaf by the attendant staff have no speech or hearing loss.

(8) Standard tests of hearing, speech, achievement and personality are difficult to administer and to evaluate for the deaf who are also retarded. Administration will require makeshift directions; some sub-tests can't be used; great care and considerable time will be required to insure that the patient understands and is not frightened in the testing situation. Most important, standard tests may not be appropriate for measuring change in these severely handicapped patients and it is well not to rely on them as sole evaluating instruments. Rating scales and objective observations constructed for the purpose and closely relevant to the expected changes will be more useful.

It is not uncommon to fail to get any response from these patients in standard approaches to hearing testing and when this happens, it may be impossible to determine the meaning of failure.

INTRODUCTION

In 1959 a modest program for training some of the known deaf patients was developed at the Lapeer State Home and Training School. It was soon clear that a larger staff with varied background was required if a test were to be made of the usefulness of special training and attention for these patients who traditionally had been thought difficult if not impossible to habilitate.

In seeking resources for expanding the program the Director of Education turned to the Vocational Rehabilitation Division of the Department of Public Instruction and the Assistant Director for Services for the Mentally Retarded, Department of Mental Health. They, in turn, brought the Research Section of the Department of Mental Health into the group and a program for habilitation of patients with these multiple handicaps was planned which was to include six state institutions for the retarded. The federal Vocational Rehabilitation Administration awarded a research grant to this group through the Department of Mental Health.

An advisory committee was established and subcommittees of this group determined program and research design - the latter to test the effectiveness of the program. The general problem had by then been defined as exploration of the extent and nature of the deaf-retarded population residing in the six state institutions for the retarded and development of a program for personal-social and vocational habilitation of these patients. The program designers predicted that personal-social habilitation would be a necessary but not sufficient circumstance for occurrence of vocational habilitation. In addition, the opportunity for vocational training and experience would be required.

Within the framework of general interest in habilitating the deaf-retarded who were receiving little assistance through regular institution resources, several somewhat more specific objectives were identified. These objectives can be roughly translated into the four phases of the overall project. Though not entirely separate in time, there was a rough chronological order to these phases dictated by the need to locate and select subjects, bring them together and prepare them for participation in the program. These phases were (1) assessment of deaf patients in all state institutions to determine their physical, psychological and educational characteristics as well as degree of hearing impairment; (2) pre-vocational education for a sample of patients judged to possess the best potential for profiting from an habilitation experience specifically designed for those with severe hearing handicaps; (3) psychotherapy for half of this sample to evaluate the contribution it might make to the habilitation process and (4) vocational experience for all patients who could be placed in a work situation, either on or off the hospital grounds, which was suited to their level of development.

Prior to elaborating the project plan, a description of the organization and facilities for carrying on the project is in order. The project directors were the Assistant Director for Services for the Mentally Retarded, Department of Mental Health, and the Superintendent of Lapeer State Home and Training School. The training program was supervised by the Director of Education at the Lapeer State Home and the evaluation research was supervised by the Associate Director, Division of Research and Development, Department of Mental Health. The advisory

committee membership consisted of these four and, in addition, a representative from the Vocational Rehabilitation Division of the Department of Public Instruction, a psychologist from Coldwater State Home, a consultant in psychology, a consultant in audiology and two project staff members. The organization was altered at various times on the basis of three interacting factors: (1) the changing project program; (2) experience with staff and program and (3) staff turnover.

Staff for the assessment phase of the study consisted of three psychologists and one social worker who, with the audiologist consultant, traveled to each of the relevant state institutions to carry out their diagnostic work. When that was completed and the project participants had been selected, the staff for the training phase was established at Lapeer State Home to which all patients selected for the study and not then residing at Lapeer were transferred. The staff at that time included one psychologist, who coordinated the program at Lapeer, and four teachers, one of whom was supervisor of the education program during this phase. This group was operationally responsible to the Director of Education at Lapeer State Home.¹

Lapeer State Home and Training School is a relatively large institution with some 3,600 resident patients. Under medical direction, it is an institution with a modern hospital and nursery and provides programs for all ages and all degrees of retardation. Most patients live in cottage-type domiciles ranging in size from 50 to 125 patients. Attendants provide care and program activities in these cottages. Such other training or activities as patients participate in are provided in special programs, a major one of which is the Woodside School. This school, a modern plant built in 1957, includes classrooms for educable and trainable patients, a library, a gymnasium, shops and a homemaking room. The project training program was carried on in this plant where the four teachers had classes of deaf patients. The remaining facilities were made available to this group as will be described later.

In addition to the school, the institution includes departments of social service, nursing, psychology, medicine, recreation and work training, all of which were available to participate in the program as it became integrated into the larger institution's program.²

¹ This was the predominant staffing pattern until the last year when a speech therapist and a workshop supervisor were added. At various times there was also an additional psychologist - usually half-time. There was also a speech therapist for the hard-of-hearing but this group was distinct from the regular experimental program. The four teachers for this program were all graduates of Galludet College and one, the supervisor, also had training and experience with the retarded.

² There were some problems in this attempted integration in part because the program was identified as "rich" and "experimental" and this definition provided an independent identification for some staff members. This problem of integrating experimental projects or research programs into the institutional setting has been discussed extensively in the literature and need not be further reviewed here. Advice to those establishing such programs is briefly given in the Review. (Page v).

THE ASSESSMENT PHASE

The assessment or diagnostic phase was to provide a base for training program planning. It was designed to determine whether hearing handicaps are a common problem among institutionalized retarded patients and to provide a definitive statement of the kinds of problems experienced by such patients. The methods and results of this phase, based on a prior report, are summarized here.³

The patients studied were selected by attendants in the cottages at the state training schools. They were asked to refer for testing any patient whom they suspected might be deaf. A total of 169 patients were so located. These patients ranged in age from ten to forty years with a mean age of twenty-three. The sixty-three females were slightly younger as a group than the 106 males and they had been hospitalized for a somewhat shorter period. The range in length of hospitalization for the entire population was from six months to nearly thirty years with a mean of eleven years. Some of the patients had participated in the formal education program at the institution where they lived.

The evaluation included measurement of the patients' physical and psychological characteristics and their educational achievement, all of which were considered essential in determining appropriate training programs for subdivisions of the population. The nature of the patients' handicaps made it difficult to select appropriate instruments for assessment since most standardized tests assume subjects can respond to verbal directions in carrying out the prescribed tasks and most tests do not include deaf persons as part of the standardization group. Even the apparently objective procedures used in measuring hearing ability are difficult to apply with the deaf-retarded since it is often problematical whether a response failure is due to failure to understand directions, fear of the equipment or actual hearing deficit.

The instruments finally adopted were administered by pantomime and makeshift signing and included both standard tests and a set of rating scales constructed for the project. Selected instruments from the twenty used and the results obtained with them are summarized in tables which follow.

Speech and Hearing Evaluation

Audiometric testing was conducted in an I.A.C. two-room unit, Model 402 C-T. The testing equipment included a Model 15-C Beltone two-channel audiometer. All stimuli could be monitored and switched directly to any speaker, earphone or bone

³ "Identification and Vocational Training of the Institutionalized Deaf-Retarded Patient, The Diagnostic Study," Research Report Number 43, Department of Mental Health, Lansing, Michigan.

conduction oscillator from this panel. In addition, a microphone attached to the control panel provided a speech circuit. A high fidelity speaker was located in each of two corners of the Test Room and a ceiling-mounted microphone permitted intercommunication.

Results on the speech and hearing evaluations are summarized in Table I. Note that the forty-one patients who were unable to respond to any testing are excluded from the table.

Perhaps the most striking result is not that forty-one or about twenty-five percent of the 169 patients tested were unable to respond but rather that tests which classified patients as to degree of handicap indicated one-fourth or more had no speech or hearing loss in spite of the fact that they had been referred by institution staff members as deaf.

Intellectual Function

The measures of intellectual function which proved useful with this population include three standard tests and two examiner's ratings constructed for this project.

The Wechsler Scales: WAIS and WISC⁴ - These were chosen because of their wide use in special education and clinical settings and their inclusion of both verbal and non-verbal sub-sections. These scales also provide many clues regarding personality attributes and type of psychopathology. The WAIS was administered to all subjects whose age was sixteen or more and the WISC to all others. In those instances where oral communication was impossible, certain of the performance sub-tests were administered in pantomime, e.g., block design, object assembly. The order of presentations for the WAIS and WISC was arranged to permit subjects to begin with those sub-tests least dependent upon verbal and communicative skills and which offered maximum interest and chance of success to this population. Scoring was accomplished as outlined in the respective test manuals. Examiners were instructed to administer at least three performance sub-tests before concluding the subject was unresponsive or unproductive.

The Goodenough "Draw-A-Man" Test⁵ - This non-verbal test was chosen because of its simplicity of administration and its high correlation with both the Binet and Wechsler scales in the lower levels of intelligence. This test, too, serves as

⁴ Wechsler, D., Wechsler Adult Intelligence Scale. Wechsler Intelligence Scale for Children. New York: Psychological Corporation, 1955 and 1949.

⁵ Goodenough, F., The Measurement of Intelligence by Drawings. New York: World Book, 1926.

TABLE I

RESULTS OF SPEECH AND HEARING EVALUATIONS

Tests	Number*	Mean Score	Standard Deviation
Speech Reception Threshold (SRT) - in decibels	108	33.15	22.49
Speech Discrimination (SD) in percent (100% = best discrimination)	68	83.50	19.81
Puretone Hearing Loss (Average loss in decibels at three frequencies in best ear)			
Air Conduction	114	43.29	29.41
Bone Conduction	108	27.69	19.71
Speech Efficiency (Templin-Darley) - in percent (100% = maximum speech efficiency)	128	53.23	35.45

Classifications	Number	Percent of Cases	Mean Class	Standard Deviation
Hearing Loss	128	100 %	2.48	1.29
I Normal (0-15 dB)	37	28.9		
II Mild (20-40 dB)	32	25.0		
III Moderate (45-60 dB)	33	25.8		
IV Severe (65-80 dB)	12	9.3		
V Total Loss (85-100 dB)	14	11.0		
Intelligibility of Connected Speech	128	100 %	2.39	1.19
I Readily	40	31.3		
II If Topic Known	33	25.8		
III Sometimes	20	15.6		
IV Unintelligible	35	27.3		
Speech Impairment (AMA Guide)	128	100 %	3.00	1.58
I None (0-10%)	37	28.9		
II Mild (15-35%)	16	12.5		
III Moderate (40-60%)	20	15.6		
IV Severe (60-85%)	20	15.6		
V Critical (90-100%)	35	27.4		
Speech and Hearing Impairment Related to Whole Man (AMA Guide)	128	100 %	3.22	1.53
I None (0-10%)	25	19.5		
II Mild (11-23%)	23	18.0		
III Moderate (24-35%)	16	12.5		
IV Severe (36-47%)	27	21.1		
V Critical (48-58%)	37	28.9		

*Varying N's result from failure of some patients to respond to test

an excellent point of departure for additional analysis of personality attributes which was to be used in developing the training program. Here the task presented to the subject was to draw a person. If the standard request was not usable, the examiner attempted to get the subject to imitate a drawn circle and square. If successful, the examiner exposed card 3BM of the Thematic Apperception Test series to the subject for five seconds after telling him he would be shown a picture and be expected to draw a person. If the subject hesitated, he was urged to draw or make a picture just like the one he was shown. The subject was urged a second time, if necessary, but no further effort was made. After the first figure drawing was obtained the subject was asked to draw a person of the opposite sex. A mental age was obtained by scoring the male figure according to the original Goodenough criteria.

The Hutt Adaptation of the Bender-Gestalt Test⁶ - This test seemed highly suitable for this population because it offers a test of both intellectual functioning and personality based on visual-perceptual material and is relatively uninfluenced by variations in verbal ability and cultural experience. The procedure used is essentially the same as that described in the test manual except that the language used in the elaboration phase was simplified and the concept of "changing" the production emphasized. This was done to avoid any implication that previous performance was inadequate and should be "improved" upon. A mental age was obtained for each of the basic productions of the copy phase using the age norms from Bender's original monograph.⁷

Examiner's Estimate of IQ - This estimate is a part of the Summary Rating Scale devised for this project. The scale allows the examiner to rate a particular subject on eighteen dimensions which can be either directly observed in, or inferred from, the total psychological testing situation. Those dimensions refer to work habits and effectiveness of communication as well as intellectual and personality factors. The examiner's estimate of IQ is the decision relevant here.

Ease of Making Test Directions Understandable - This is a part of a scale devised by Hutt which permits examiners to rate deaf-retarded subjects on a number of dimensions which refer to the validity and general significance of a particular test procedure. The ratings cover all forms of psychological testing including intellectual measures but are reported here because of the close relationship between intellectual function and this particular scale. An individual rating for each test administered was filled out by the examiner directly after each testing session. Ratings were on a five point scale. There were three rating scales for each subject to whom all tests were administered.

⁶ Hutt, M. L. and Briskin, G. J., The Clinical Use of the Revised Bender-Gestalt Test, New York: Grune and Stratton, 1960.

⁷ Bender, L., Bender Visual Motor Gestalt Test, American Orthopsychiatric Association, New York: 1938.

Results on the intellectual measures are given in Table II. A considerable variation in level of measured intelligence is apparent when the results for the three standardized tests as well as the constructed Examiner's Estimate are compared. The Revised Bender-Gestalt yields both a mean and a median score well above other measures while the Examiner's Estimate resulted in a mean lower than the standardized tests. When all patients are taken into account by placing non-responding cases in the lowest class interval and computing a median, the group appears much more severely retarded than it does on the basis of the means. The means suggest a group with mild retardation. Yet the fact is that approximately twenty percent of the total population was unable to handle the standard intelligence tests at all. It is difficult to determine whether this is an indication of hearing deficit and communication problems or the severe retardation of the non-respondents.

TABLE II

RESULT OF INTELLECTUAL ASSESSMENT				
Test	Number	Results		
		Median*	Mean	Standard Deviation
Wechsler (WISC-WAIS)				
Performance	108	46	61.2	20.5
Verbal	72	43	57.9	13.1
Full	18	43	59.1	10.2
Modified Goodenough	133	50	60.3	18.2
Bender-Gestalt Revised	142	72	71.3	20.5
Examiner's Estimate of IQ	169		55.09	19.9
Ease of Making Test Directions Understandable	108		7.92 [†]	4.14

*Patients for whom no scorable response could be obtained are included in the lowest class interval for the particular distribution. By this method the N was 169 for all measures reported.

†Based on a possible range of 3-15.

The ratings given each patient on ease of making test directions understandable were combined into one score with a possible range from three to fifteen for the 108 patients who were given all three intelligence tests. The group obtained a mean score of 7.92 which appears realistic in relation to mean test scores suggesting that those patients who could complete all intelligence tests were mildly retarded.

All of these data imply that the group which could be tested is more handicapped by communication and hearing problems than by retardation. In other words, it is suggested that with adequate training at an appropriate time in their development, many of the patients would not require institutionalization for retardation. This inference cannot be drawn for the non-responding group which includes many patients who also could not respond to hearing testing for it is not possible to determine whether the response failure was due to hearing and communication problems only, or to those problems complicated by severe retardation or to severe retardation with little if any hearing loss. There appear to be two distinct groups, one of which would need institutionalization and the other which would not with adequate early training.

Academic Achievement

Grade scores for each of the three basic school subjects, arithmetic, reading, and spelling, were obtained through administration of the Wide Range Achievement Test. It was selected as the measure of academic achievement because of its simplicity, ease of administration and clinical adaptability.⁸ Examiners were instructed to exert every effort to obtain scorable responses from each patient, individually tested, and were restricted only to the order of the test which, beginning with arithmetic followed by reading and spelling, was considered the most conducive to motivating the patients to optimum performance.

Results indicate that the mean was slightly less than second grade for each of the three above subject areas. In arithmetic the mean grade level was 1.9, in reading, 1.7, and in spelling, 1.6. These grade levels seem rather low for a group of patients whose mean age was twenty-three, some of whom had participated in the education program of the institution if they were believed able to benefit from it. The achievement scores also seem low for patients who obtained intelligence test scores in the moderate to mild range. These results were an early indication to the project staff that standardized paper and pencil tests of academic achievement were not adequate devices for assessment of retarded patients especially when they also had severe limitations in communication. It was difficult to convey to them the nature of the task and the importance of their attention to it and this was much more a problem than with the more novel tasks related to both hearing and speech tests and individual psychological tests.

8

Jastak, J. and Bijou, S., Wide Range Achievement Test, New York: Psychological Corporation, 1946.

Physical Examination

The schedule for the physical examination was derived from the routine procedures currently in use in the state hospitals in Michigan. The major purposes of the schedule were to identify the extent of and type of multiple handicaps suffered by these patients and to identify patients with physical disorders which would preclude their participation in a program of habilitation.

The kind of handicap manifested by these patients ranged from skin eruptions to chronic disorders involving one of the physical systems. Fifty-three patients had at least one handicap in addition to retardation and deafness. Thirty-two patients had no handicap beyond their retardation and deafness. Approximately sixty percent of the patients had one or two additional handicaps, approximately fifteen percent had three or four, and a few patients had more than four additional handicaps. While retardation and/or speech and hearing problems are the only physical handicaps which can be said to characterize this population, the patients clearly have a higher incidence of other types of physical problems than would be found in the general population. Most of these would be expected to complicate the work of habilitation and vocational placement.

Epidemiological Considerations

Doubtless the initial method for selecting referrals to the project for diagnosis, that is, the judgment of attendants presumed familiar with the patients' handicaps, failed to identify all those who might have a severe hearing loss. There were only 169 such referrals from an institution population of approximately 7,600. This rate of twenty-two per 1,000 is markedly below that expected on the basis of other studies. For example, Johnston and Farrell reported approximately one-fourth of a sample they tested to have a significant hearing loss.⁹ Schlanger and Gottsleben found thirty-five percent of a sample of 498 retardates to have demonstrable hearing loss.¹⁰ Kodman, Siegenthaler and Bradley, in independent studies, found that as much as twenty-five percent of the mentally retarded show at least mild hearing loss.¹¹ Whether these differences are solely due to the

⁹ Johnston, P. W. and Farrell, M. J., "Auditory Impairments Among Resident School Children at the Walter E. Fernald State School," American Journal of Mental Deficiency, Vol. 58, 1954, p. 640-643.

¹⁰ Schlanger, B. B. and Gottsleben, R. H., "Testing the Hearing of the Mentally Retarded," Journal of Speech and Hearing Disorders, Vol. 21, No. 4, 1956, p. 487-493.

¹¹ Kodman, F., Powers, T. R., Philip, P. P. and Weller, G. M., "An Investigation of Hearing Loss in Mentally Retarded Children and Adults," American Journal of Mental Deficiency, Vol. 63, 1958, p. 460-463.

Siegenthaler, B. M. and Krzywichi, D. F., "Incidence and Patterns of Hearing Loss Among an Adult Mentally Retarded Population," American Journal of Mental Deficiency, Vol. 64, 1959, p. 444-449.

Bradley, E., Evans, W. E. and Worthington, A. M., "The Relationship Between Administrative Time for Audiometric Testing and the Mental Ability of Mentally Deficient Children," American Journal of Mental Deficiency, Vol. 60, 1955, p. 346-353.

initial referral procedure used here or reflect a difference in the testing procedure and standards of classification is not clear but it appears likely that the population identified in the project understates the extent of hearing handicap throughout the institution population.

On the other hand, the results indicate that referrals were made for conditions inaccurately identified as hearing loss since at least one-fourth of the patients turned out not to have this handicap when thorough testing was done.

It should be stressed, however, that forty-one or one-fourth of the patients were too handicapped to respond to hearing testing and another sixty-four or thirty-seven percent tested as severely or critically handicapped in speech and hearing. These patients represent the group the project sought to identify for a special training program. The foregoing discussion summarizes some of their characteristics and offers relevant conclusions regarding the population identified. The training project per se was designed to provide a means for developing effective programs through appropriate experimentation which could then be used in a center for the deaf-retarded referred from the entire state program. The diagnostic assessment phase was structured to gain detailed information about the deaf-retarded and the suspected underestimation of their numbers was not a significant loss in terms of the total project goals and resources.

The results were used immediately to select groups of patients for the intensive academic and pre-vocational training programs which were to constitute the second phase of the total project. The nature of the results indicated that such programs would best serve the institutional population if they included patients with moderate to severe hearing loss as well as those who were deaf and this practice was followed as the program was developed.

THE TRAINING PROGRAMS

Selection of Groups

On the basis of the results of diagnostic assessment, forty-five patients were selected as most suitable for the educational training phase of this program. This selection was accomplished by first eliminating from the total of 169 potential pupils all individuals who were psychotic, brain-damaged, not toilet-trained or who manifested such a severe degree of retardation or behavioral symptomatology as to incapacitate them for work in the classroom setting. Of the remaining number, a group of thirty-eight were selected between the ages of fifteen and forty whose audiometric data indicated at least a moderate hearing loss. This was accomplished by beginning selection with persons possessing the highest auditory thresholds, and as necessity required, moving down to, but no further than, those in the group designated as having a "moderate" hearing loss (45-60dB). In all instances the criteria were considered in the following order of priority: pure-tone; air and bone conduction; and finally the Speech Reception Threshold. Of this original forty-five, six were lost to the project through various forms of attrition such as movement out of the institution or the development of behavior problems judged to be too disruptive and/or deviant from the general pattern of the remaining patients. There were seven patients with some hearing loss but also with some speech for whom a special program was arranged. The final number for educational training was thirty-two.

These thirty-two patients were divided into two experimental groups of twelve each and one control group of eight patients. One of the experimental groups was to receive the educational program only, while the other was to participate in the educational program and was to receive professional help with relevant personality problems and adaptational difficulties. This help is referred to here as psychotherapy. The control group was to be involved only in the routine institutional program and was excluded from any special program provided by the project. These groups were matched on three variables: overall estimate of IQ; educational achievement as measured by the Wide-Range Achievement Test and the degree of psychopathology as measured by the Nineteen Factor Rating derived from the Bender-Gestalt record. Matching was tested by comparing the means of the various groups by "t" test. An effort was also made to achieve a balance among the groups in terms of known personality characteristics of the subject, such as acting-out, aggressive behavior or withdrawal.

The two experimental groups were further sub-divided, yielding four groups. Two were matched in relatively high achievement levels and closely related in other factors and two were matched in relatively low achievement and also closely matched on other factors. These four experimental groups and the control group were the basic sets of subjects initially established for the training phase of the study.

Classes for the four experimental groups were rotated so that every group was taught by each of the teachers for at least one period during the day.

At the end of the first eight months, the staff evaluated the educational program. This evaluation indicated that differences in abilities were such that patients could not be handled in the two fixed categories of high or low achievers. It was decided to regroup the students into three sets, one consisting of high, a second of medium and a third of low achievers. This necessitated mixing the heretofore separated education and psychotherapy groups but it was agreed this should be done because it appeared necessary to maximize educational achievement and because the psychologists' observations of the therapy process lent support to the change. All of the group placements were made through cross comparisons of the teachers' evaluations made in the classroom during the first eight months of the training period. There were no disagreements among the teachers regarding the assignments to these three new groups.

It was felt that rotation of classes among teachers was no longer useful after this initial cross comparison had been accomplished and a more intense educational program could result from fixed class situations where the patient had the same teacher for a major part of his training. Therefore, teacher rotation was stopped.

The speech and lip reading group consisted of seven pupils (five boys and two girls) ranging from nineteen to thirty-six years of age. This group was made up of patients selected from the original assessment population but whose hearing tests indicated they had too much residual hearing to be trained with the deaf group. Later, other hard-of-hearing patients were located and added to the group. Table III shows the design of the project finally developed when the educational training program was fully underway.

TABLE III

DESIGN OF PATIENT GROUPS IN THE EDUCATION PROGRAM				
Group	N	Description	Program	Classroom
1A	4	High Achievement	Education)	one
1B	4	High Achievement	Education plus Psychotherapy)	
2A	4	Medium Achievement	Education)	two
2B	4	Medium Achievement	Education plus Psychotherapy)	
3A	4	Low Achievement	Education)	three
3B	4	Low Achievement	Education plus Psychotherapy)	
Control	8	Range on Moderate	Regular Institution (only)	
S-L	7	Hearing Loss	Speech and Lip Reading	

Description of Education Program

Early work with the institutionalized deaf-retarded led to the opinion that many of these patients could be habilitated, some to the extent that they might eventually be employed outside the institution while others could be taught enough in the way of self-care, responsibility and work habits to enable their placement on various jobs within the institutional setting. A third group, perhaps unable to reach the level of development necessary for any work placement, could benefit from training which would assist them to better care for themselves, communicate with others and generally participate in cottage life and institution programs which their present condition prohibited. The general aim of the training program then was to develop the potential of a wide-range of institutionalized deaf-retarded toward the goal of vocational or work placement appropriate to their maximum level of functioning.

Regardless of the possible potential of any of the patients, initial testing indicated the education program would first have to be directed to providing certain basic skills and the greatest emphasis had to be on communication development. Although there are two distinct "method" schools of thought on educating the deaf, the oral method and the manual method, adherence to either as such was avoided in preference to a combination of both. Development of communication skills was the primary emphasis in all classes regardless of what other content was included in the evaluation program. When necessary, as was frequently the case in the early stages of the program, play acting and pantomime were also used to promote understanding when it became apparent that the more formal approaches were ineffective, too time-consuming or too frustrating.

As noted earlier, for eight months the educational program was conducted on a rotation basis with each of the four groups coming in contact with each of the four teachers daily. After an evaluation at eight months, the four groups were reconstituted into three groups as described above. (See page 12)

Content of the academic program for each of the reconstituted groups, each one now taught by one teacher except for special programs, was as follows.¹²

High Achievers - The abilities of this group of eight pupils permitted a much wider academic program than was possible with the other groups. The curriculum was designed to emphasize educational fundamentals including reading comprehension; simple, understandable written language; practical mathematics. The major goal behind each classroom undertaking was improved social adjustment

¹² Program content will be given here in very brief form but a separate brochure outlining content and methods in considerable detail has been prepared and is available on request from the Director of Education, Lapeer State Home and Training School, Lapeer, Michigan.

which would prepare these people for eventual return to their communities and the particular topics studied were selected to emphasize this potential. Classrooms were equipped with standard desks and chairs for the pupils, each desk labeled with the owner's name. Other materials included an encyclopedia and various dictionaries and magazines, labeled boxes containing school supplies and pupils' boxes of personal supplies and materials. There were blackboard areas and bulletin boards on which material illustrating current lessons or recent events, weather and calendar information and class or school notices were displayed. Charts, maps, drawings, magazine cut-outs and similar items were used, with explanatory sentences and most were changed periodically. Others had permanent exhibits such as the arrangement of a clock with movable hands showing both hours and minutes to teach reading of time. The arithmetic program in this group consisted of individual notebooks and instruction and group exercises. Sub-groups with similar abilities were identified in the course of training in arithmetic and these pupils were handled somewhat differently within the total classroom settings. Some could handle only simple addition and subtraction while others could do multiplication and division and work was begun at the appropriate level for each pupil.

Middle Achievers - The general teaching aims for this class of educable retarded were similar to those for the high achievers. The teacher conceptualized the socialization process as one of developing self-awareness, constructive relationships to others and the concept of self-discipline. The most specific content of this teaching focused on improving reading and writing skills. These pupils had passed beyond the stage where they could develop vocabularies by exposure to isolated words, and a more dynamic approach was needed if reading and writing skills were to be improved. Therefore, almost all reading material used during the first six months was prepared by the teacher and was based on a question/answer technique believed most effective in encouraging reading and practicing writing. The area of personal information was used as a place to begin and a regular distribution of mimeographed lists of personal data questions was made. The questions were changed routinely becoming more complex and covering more topics as time went on. Three illustrated mimeographed booklets were prepared to form the basis of lessons on clock time, calendar time, and linear measurement. Simple sentences tied in with the illustration on each page and were formed so that they answered an unspoken question or could be repeated in a table of equivalents. Book work in arithmetic was given secondary consideration and much of the written work involved practical arithmetic which was considered most appropriate for these pupils. Books were, however, distributed at least twice a week, and a constant search went on to find some way of explaining "borrowing" to those who had reached that level. The final solution, as with most of the work done here, seemed to lie in giving repeated examples until the person concerned understood.

Low Achievers - The lower group consisted of eight patients who may be characterized as "trainable mentally retarded." Two were spastic, one mildly and the other evident; one was hyperactive; two were hypoactive; four were suspected aphasics. All were well past school age, and generally their attainments and achievements academically, vocationally and socially were very low. Because this group was very low in any form of achievement it was predicted they

were unlikely to leave the institution and the protected environment it offers. Therefore, the primary aim was to help each patient achieve his maximum potential as a happy, comfortable person and to develop the capacities he might have for increased socialization and satisfying productivity in institution programs such as a sheltered workshop. Much of this work consisted of developing hobbies and, in the process of this, developing ability to communicate with others and live comfortably in small groups. Any resource the teacher could find was used toward this aim of socialization.

Program for All Groups - In addition to these programs carried out in the classrooms, a number of special training programs were used with all groups. The entire group made periodic excursions to a variety of business and service facilities in the community and the institution. These trips were preceded and followed by a coordinated unit-type curriculum designed to clarify the various activities observed. Class discussion focused on the purpose of the facility, use of objects within it, work performed, acceptable behavior and apparel while there, conduct to be avoided, and job possibilities for the patients in that setting. Supplemental activities carried out included a play which the project patients presented for staff members and other patients. Regular religious services in combined oral-manual language were held and socials, parties and captioned films for the deaf were offered regularly to promote social interchange and to develop a knowledge of social rules of behavior. An arts and crafts program was provided to develop small muscle control, improve coordination, relieve tensions, and provide enjoyment in living experiences. The physical education program stressed sportsmanship and enjoyment rather than the importance of winning and the perfection of skills. However, to make it possible for all to participate and enjoy the program, males from all education groups were divided into two classes on the basis of skill. The six patients in the relatively skilled group were coached in basketball and were able to participate in the intra-home basketball games under the sponsorship of the Recreation Department. Some games were also arranged with the teams from the Michigan School for the Deaf, which is located in an adjacent community. The second group consisted of nine males who were more severely disabled and here team competitions, group games and individual exercises were practiced. The girls' gym period began with conventional games and calisthenics, but these proved uninteresting and modern dancing was substituted. It was soon realized that this activity provided a good way to integrate the deaf pupils in the total school program by allowing their participation in the assembly which is held monthly. Therefore, a number of boys were chosen to learn with the girls and an extra period was set aside for this purpose. The dance group evolved into a mechanism for a wide range of social relationships, including performing for the other patients at the Lapeer State Home and for social organizations in nearby communities. It provided experience in preparation, teamwork, social contact, opportunities for discussion of appropriate conduct, manners and conversational topics for such occasions. Homemaking included handwork such as knitting and sewing, cooking, and general house-keeping knowledge. Instruction was also given in operating sewing machines. During the first few months, lessons in cookery largely emphasized gaining a familiarity with equipment and utensils, reading and following recipes, planning meals and comparing prices. Later snack items were cooked and finally the girls prepared and served picnic meals and party refreshments for the patients in the

project. General housekeeping covered use of the washing machine, minor dry cleaning, ironing and pressing with the object of encouraging neatness and good appearance, clothes care and economy. Household or domestic skills were also taught and were useful as pre-vocational preparation for those girls who were later able to accept part-time positions as domestics. Training in using a typewriter was originally begun as an aid to those whose spasticity made their handwriting illegible. However, several patients developed considerable skill and the program was extended to the remainder of the group. Exercises were prepared for training purposes and an attempt to teach proofreading was made.

Description of Psychotherapy Program

The basic purpose for including psychotherapy in the program was the belief that the handicapped, here the deaf and the retarded, are more susceptible to problems in personal adjustment. The sensory-perceptual deprivation and resultant language deficit experienced by the deaf probably has a delaying effect on the development of their intellectual potential. Frustration of potential by this communication barrier with the rest of society is believed to lead to adjustment problems in many instances.

In the case of the retarded, the role of developmental experiences in the acquisition of behaviors socially defined as signs of mental retardation has been amply documented in the literature.¹³ Patients in institutions for the retarded are sometimes there because of factors other than structural intellectual deficit. It is also true that even those whose retardation has demonstrable organic etiology can be further incapacitated by emotional conflicts and psychological problems which overlay the intellectual deficit.

If emotional conflicts are common and often incapacitating among the deaf and retarded then some direct assistance for these patients to help them with these conflicts is indicated in a training program. The usefulness of this specialized help could be evaluated by providing it to one-half the training group and not to the other. Therefore, the training group was divided as outlined above and patients were matched as closely as possible on intelligence, age, sex and degree and type of maladjustment.

The patients included in the psychotherapy group also participated to the same degree as the other patients in the educational program provided, and both groups participated in all activities just described.

The activities involved in the psychotherapy program were the responsibility of the psychology staff. Although one of the most productive members of that staff was not a qualified psychologist, this person received consultation from the project psychology consultant. The personal and professional orientations

¹³ Handbook of Mental Deficiency, Norman R. Ellis, Editor, New York: McGraw-Hill, 1964.

of the psychology staff varied, a fact which was helpful in providing a wide range of activities through which, it was hoped, therapeutic goals might be implemented. Because of the lack of guidelines from the literature and the limited experiences of the psychology staff with this population, much of the program was highly exploratory. When one approach seemed to be unsatisfactory, another was tried. When some patients seemed either too retarded or disturbed to participate, they were involved in another activity.

Each psychologist suggested techniques which he thought feasible and appropriate and most suggestions were tried and/or explored. These ranged from activities designed to encourage expression, e.g., fingerpainting, to those that were used to provide a growth medium for self-expression and control, cooperation and experiences of success and fulfillment, e.g., special projects, gardening, keeping scrapbooks. Those who possessed particular talents or abilities were encouraged to develop them and help others in their efforts. The brighter, more communicative patients participated in group therapy with the aid of the teachers of the deaf who acted as sign language interpreters. Another technique was the "total push" handling of daily disturbances and problems by spending considerable time with the principals involved and trying to get them to understand how the situation came about and to decide on a way of dealing with similar difficulties in the future. There was a very high rate of interpersonal problems and this attempt to handle them seemed, at times, to be the sole effort of most staff members. Psychotherapy in the traditional, one to one interview at regularly scheduled hours, was not used since the staff believed this inappropriate with this group. The mechanism used would appear in many instances to an observer as a hobby or crafts session but the difference was the attempt to deal directly with patients' interpersonal conflicts and responses to them and to focus on some interpretation of their communication and activities during these therapy sessions.

Program for the Hard-of-Hearing

As mentioned earlier, some patients were found in the assessment phase who had enough hearing to profit from speech and lip reading training. Therefore, a group of seven patients met regularly for this purpose but did not participate in the regular education program.

The original plan was to teach only speech and lip reading for a three hour period but spelling, reading, language and arithmetic were soon added to increase the training for this group. Much of the speech training had to be on an individual level and this was managed by use of work books and assignments for the rest of the class so all patients were in the classroom at the same time and the total program consisted of a four hour period each day.

Charts of various kinds were made with the help of the class which consisted of sets of pictures having to do with a particular subject such as food, clothing, flowers, animals, occupation, home and farm. These charts were used in giving individual instruction in both lip reading and speech by naming and/or identifying objects. Following the charts for single word identification, short sentences were given and then stories were told. Commands were also used such as "Put your hand behind your ear," "Go to the mirror and comb your hair," "Get a magazine

and look at it." Simple number combinations were also used. Lip reading was given without voice so that patients with hearing aids could not depend on their residual hearing.

In the speech therapy the order of training went from vowels and consonants to combinations and words and finally sentences. Each patient was classified according to sound he found difficult and particular attention was paid to assisting him in these areas. Flash cards, mime, singing and play back from a tape recorder were all used as techniques for training. Position of tongue and teeth were taught by use of pictures of the tongue, teeth, lips, palate. Mirrors were used to help understand the correct tongue position.

Evaluation of this program, an extension of the project required by the special group of patients, was not included as a formal part of the project design.

Vocational Programs

By the beginning of the final year of the project it was possible to add patients from among those recently admitted to the institution or transferred there from other institutions in order that they might participate in the special program for the deaf. In the fall of 1964, the enrollment in the total program became fifty-eight patients ranging from five to thirty-six years of age, fourteen of whom were females. A new and final phase of the project was added for those patients ready for vocational training and job placement. The forty patients who were fifteen or more years old became the pool from which patients for vocational placements were drawn. The group who had served as controls were also brought into the education program at that time since it was no longer necessary to maintain the non-trained group. The educational training program went on for new patients and for those who were not yet ready to move out of the classroom setting.

Most of the activities engaged in during all the education programs were accomplished in a school setting but the staff's guiding concern in all of them was that the training be pre-vocational in nature. It emphasized those skills, habits and attitudes generally considered necessary prerequisites for any type of meaningful work. The same purpose was basic to the activities outside the regular classroom and in those which were primarily identified as pre-vocational. The community trips, school shop for males, and homemaking for females, all were parts of the non-academic education program which elaborated training in a way commensurate with the overall goal of vocational placement.

The more formal vocational program initiated for the last twelve months can be divided into three sections which encompass the work training procedures used with the original group of patients and all new patients who were adequately prepared academically to participate, i.e., would receive no particular benefit from full-time attendance in the classroom program.

Sheltered Workshop - This workshop was to serve three primary functions. It was designed as a pilot model for an expanded workshop for the institution in general; it provided an additional work tryout for those individuals in need of some further training in work habits and some further evaluation; it was to be a relatively permanent work opportunity for those patients whose likelihood of outside employment was minimal. This workshop was supervised by a man who had extensive experience working with the retarded as an attendant and as an attendant supervisor at another of the state institutions. He had been a staff member of the project for some time prior to the initiation of the workshop and had learned to communicate by sign language and pantomime with the patients and knew most of them personally. He was thoroughly familiar with their progress in the pre-vocational programs. His program began with twenty-four males who were trained to carry out tasks relevant to the work activities which could be obtained from the community and carried on in this setting. Initially this work, obtained from the Goodwill Industries, consisted of lamp repair. Patients were taught progressively more complex aspects of repair so that they were finally able to pick out a lamp, identify the needed repair, obtain the appropriate parts, make the repairs, clean and package the lamp for return to the community. Goodwill Industries was able to pay a nominal fee for each repaired lamp and the proceeds from this activity were used by the patients for their own purchases. The receipt of money for the activity was made clear to the patients and they were given control over the use they made of their share of the money. As the program continued, additional piecework of various types was obtained from local companies which make small parts for auto manufacturers and build auto trailers. This piecework consisted of "jobs" assembling auto heater parts and cutting and drilling wheel brackets for trailers. The workshop supervisor broke the required work into separate tasks, evaluated the level of skill necessary and the best method for training patients to perform these skills. Often he needed considerable ingenuity to find methods to set up the tasks and make them mechanically feasible for these patients. Always the aim was to help the patients to learn the elements of the task much of which consisted of assembly of parts in an appropriate order after making small adjustments, and then to reach the point where they could carry out the entire construction without direction. Ultimately they were to determine what work had been received, what was required in the way of equipment to complete it, do the work and finally reassemble it in appropriate packages for return to the local industry. They also had to determine their output for each day and the total number of assemblies which were packaged for return. Computation of piecework rates and money earned by each patient could not be done because of a problem of payment from the industries. It might be pointed out that clearing the payment for these patients was one of the most difficult problems to be resolved in the workshop situation. The workshop, as part of an institution, was exempt from the minimum wage laws, but clearance for this exemption had to be obtained from the appropriate agencies and the industries involved had to be given formal assurance they were not in conflict with the minimum wage law. There were also problems in making direct receipt of their wages possible because payment had to be made to the institution rather than to the patients in order to avoid complications from the unemployment compensation laws. Finally, the institution rules complicated payment to patients who worked in this setting while others were occupied in situations such as the institution work program where remuneration was not possible under present procedures and legislation. Evaluation of this program was carried out in two ways. First, the

workshop supervisor determined a set of simple mechanical tasks and tested each patient on these in terms of the time required to complete them and the quality of the work accomplished. This testing was done at the beginning of the workshop experience for each patient and was repeated six months later to determine any change in speed and quality. Second, the volume of work completed in the workshop was carefully noted to determine the overall production of the group within given periods of time.

Institutional Work - This program was incorporated into the already functioning institution work program designed to give capable patients an opportunity to do meaningful work within the institution. Previously the deaf had been included only infrequently because of the rather large number of patients available for such work and because the additional handicap of deafness made these patients more difficult to communicate with and less likely to benefit from the program enough to become candidates for work placement outside the institution, a primary function of the entire program. By virtue of the training in communication these patients received in the pre-vocational program, it was possible to place them in the institution work program where they joined the housekeeping, yard, laundry, and maintenance crews. Supervision of the work was done by members of the institution staff responsible for the work to be carried out (laundry supervisor, etc.) and a follow-up evaluation of each patient was planned to determine the success of placement and the problems which the patient had in working as a part of this team. There was no change in the program in order to accommodate these patients and it was similar in content to that of other institutions for the retarded.

Outside Work Placement - One goal of this program was to place those patients who were capable of less supervised work off the institution grounds. In some instances it was possible to place these patients in homes, their own or with others, outside the institution and in others the patients commuted from the institution each day. Not all such placements were full-time, of course. Patients thought appropriate for this more advanced work situation were referred to the placement division of the Social Service Department at the institution which then attempted to place them appropriately and under the required supervision. Often this work consisted of domestic placement for the females and yard-work, odd jobs and farm work for the males. Counselling of the patients and follow-up evaluation of their work was handled by the placement staff and the project teaching staff. Formal evaluation of this part of the vocational program was to consist of a rating and narrative statement from the patient's employer according to a prescribed form and a notation of the number who were ultimately discharged from the institution or returned because of problems in the work situation. Those who were discharged were to be later contacted by the follow-up care centers which are agencies of the Department of Mental Health. The vocational program was preceded by an extensive vocational testing program in order to gain some picture of the group of patients who were being referred to the various parts of the program. No attempt was planned to measure vocational skills periodically to determine increments. Rather, the plan was to gather baseline measurements for this group of patients in terms of vocational aptitude. These measurements were to serve two purposes, the first of which was most specific to this project, i.e., within the time available prior to reporting of the results of this grant supported program.

This purpose was to simply describe the patients relative to normative data available for the tests used. The second purpose was to build a bank of data which could be used in the future as criteria for selection of patients to be placed in various types of employment. Here correlations of success in placement with results on the range of aptitude tests will be computed in an effort to locate those attributes measured by the tests which can serve as criteria for predicting success in job placement. The latter purpose could not be completed during the project period but will be possible in the future as enough placements are made and enough data accumulated in the ongoing program. Initial results are discussed below.

RESULTS OF THE TRAINING PROGRAMS

Quantitative measurements were made by use of several of the same instruments administered initially in the Assessment Phase of the project and again during and at the end of the educational training period. This re-testing was used to evaluate the extent and direction of change in either of the education groups and the control group. The education groups did not receive their training independently as explained previously, but the addition of psychotherapy for one group can be evaluated as an independent effect.

Statistically significant differences were found among these groups on several of the dimensions measured.¹⁴ Table IV summarizes the quantitative results in three areas, intellectual function, academic achievement and personal adjustment, which will be discussed here. For ease of reference, the term "education group" will be used to refer to that group getting education only while "psychotherapy" or "therapy" will refer to the group which got both education and psychotherapy.

Intellectual Functioning

If measures of intelligence reflected innate ability rather than functioning intelligence, it would make little sense to compare test results before and after a training program but, as is well documented, scores reflect functioning level and are subject to change under a number of conditions - one of which is psychotherapy. Scores are also subject to practice effects and this alone presents a problem in interpretation of results.

Because of the inability of many patients to complete the verbal sub-tests on the Wechsler Intelligence Scale, attention was focused on performance aspects of the test. The three performance sub-tests - Block Design, Object Assembly and Digit Symbol, all of which could be effectively administered in pantomime - were pro-rated to derive an IQ score.

A difference score was computed for each individual by subtracting his pro-rated IQ at the beginning of the project from the one he obtained at the final testing. Mean difference scores were then computed for each group. The education group improved an average of five points, the psychotherapy group three points, and the control group one-tenth of a point.

¹⁴ Results reported as significant here mean that the hypothesis of no difference between groups, that is, that the groups are from the same population, can be rejected with a probability of .20 or less that the rejection is in error. This probability of error is greater than the customary .05 but it is believed the risk of error is less important than the risk of obscuring discovery in an exploratory study with imprecise instruments.

TABLE IV

SUMMARY OF CHANGES AND DIFFERENCES BETWEEN GROUPS DURING THE
PRE-VOCATIONAL TRAINING PROGRAM

Dimensions and Tests	Group Comparisons by Difference Scores*		
	Education with Control	Psychotherapy with Control	Education with Psychotherapy
Intellectual Function			
Wechsler	<u>5., 0.1</u>	3., 0.1	5., 3.
Goodenough	<u>11.7, -2.6</u>	<u>8.3, -2.6</u>	11.7, 8.3
Intellectual Impairment †	<u>++ , -</u>	<u>+, -</u>	++, +
Achievement (Stanford)			
Battery Median	0.6, .19	.24, .19	.06, .24
Arithmetic	.34, .08	<u>.54, .08</u>	.34, .54
Reading	<u>-.07, .37</u>	.32, .37	-.07, .32
Personality			
General Communication	<u>0, -</u>	-, -	<u>0, -</u>
Overt Hostility	<u>+, --</u>	-, --	<u>+, -</u>
Latent Hostility	<u>+, 0</u>	0, 0	<u>+, 0</u>
Overt Anxiety	<u>+, 0</u>	0, 0	<u>+, 0</u>
Depression	<u>+, -</u>	<u>+, -</u>	+, +
Transient Disturbances	<u>+, -</u>	-, -	<u>+, -</u>
General Adjustment #	<u>0, .7</u>	<u>.2, .7</u>	0, .2
Need for Communication	<u>3.7, -2.7</u>	<u>1.9, -2.7</u>	3.7, 1.9

* Scores shown are mean differences from time one to time two. Choice of statistical test varied with the type of measurement used. Underlined sets of scores in the table designate differences between groups significant at $p \leq .20$.

† Direction of change is indicated by sign; + means improvement on the dimension, - means decrease of function, 0 means no change. Double sign indicates greater intensity relative to another group with change in same direction.

High score indicates poorer adjustment.

The same type of analysis was used to evaluate changes in Goodenough IQ's and here there was a significantly greater overall improvement in each of the two education groups compared with the control group. Results paralleled those found on the Wechsler performance sub-test, that is, the education group improved 11.7 points, the psychotherapy group 8.3 points, and the control group went down 2.6 points. The magnitude of the difference between groups was consistent for both of these tests with the education group improving approximately one and a half times as much as the psychotherapy group.

The staff psychologists rated each patient on the degree of intellectual impairment at the beginning and end of the training period. Difference scores for the three groups showed that the education and the psychotherapy groups both improved, that is, showed less impairment after training. But the control group had more impairment. The education group improved somewhat more than the group also receiving psychotherapy.

Academic Achievement

Four sub-tests of the primary battery of the Stanford Achievement Test were used to evaluate changes in reading and arithmetic; paragraph meaning, word meaning, arithmetic reasoning and arithmetic computation. Examination of the mean difference scores for both experimental groups and the controls at the time of final testing revealed no significant differences between the various groups on the battery median. Patients scored at approximately the second grade level on the beginning and ending tests regardless of the group in which they participated. The psychotherapy group improved significantly more than the others in arithmetic average and the control group improved more than the others in reading average. While statistically significant improvement was shown in both these instances, the magnitude of that improvement was less than one full grade level. Most important, the examiners concluded that at language levels as low as those possessed by these patients, standardized achievement testing is non-discriminatory.

Personality

Dimensions relating to personality and emotional adjustment were derived from three principal sources. These were rating scales devised for this project by the staff, check lists or rating devices constructed along theoretical lines and scales that were also based on theory but had been refined on the basis of previous empirical study.

Several dimensions of personality were found to change in the course of the training program among which was the reliability of general communication which decreased for both the psychotherapy and control groups. Patients who participated in psychotherapy displayed more overt hostility than they had prior to the training program while the education group improved in this regard. Control patients also became more overtly hostile. Latent hostility showed no change in the therapy and control group but the education patients were judged to have somewhat less latent hostility by the end of the project. Overt anxiety followed the same pattern.

Depression, however, increased among both the psychotherapy and control patients as did the extent of transient personality disturbance. Education patients improved on both these dimensions.

An overall rating of general adjustment indicated the control group lost ground during the project but little change was seen by raters in the patients who received education or education plus psychotherapy.

Finally, all patients were scored on the extent to which they showed a need for communication with others measured by the male figure drawing on the Good-enough. This was considered an important, if not decisive, index of the extent to which patients could benefit from psychotherapy or were moving toward interest in their world. The control group decreased in this need to communicate over time, the psychotherapy group manifested some change toward greater need to communicate and the education group showed a greater change toward the wish to communicate.

Teachers' Judgment of Effects

Teachers' judgments are the common form of observation used in instances where standardized tests are not adequate for one or more reasons. Such judgments have been the source of many ambivalent feelings on the part of researchers. Their subjective nature was, in fact, a primary impetus for the mental testing movement. On the other hand, teacher judgments often represent the richest source of information about a variety of student characteristics. These judgments were used in this program in order not to lose this source of data and because the training situation was so different from those in which most evaluation instruments are standardized. Teachers were asked to rank the patients relative to each other on the amount of change they manifested on each of the following dimensions during the training program: 1) Communication skills, i.e. written, signed, finger-spelled, gestured or pantomined; 2) Overall academic achievement - total improvement in the academic sense, including communication skills; 3) Social and personal adjustment.

Each teacher ranked the patients on these three dimensions independently for the total group of patients without regard to the training program they participated in. The inter-judge correlations were considered great enough to permit one composite judgment and final ranking of patients was based on a group decision in which all teachers participated. These group-derived ranks were used in the analysis discussed here. The teachers' rankings of patients were correlated with results on the objective and/or formal tests in the following way. Difference scores were computed for these tests which indicated the change for each patient from his first to last test. These difference scores were then ranked according to magnitude and those ranks were correlated with the teachers' rankings of patients on each of the three dimensions, academic achievement, social-personal adjustment and communication skills. After ranks were computed, results were sorted into the appropriate groups, i.e., education and psychotherapy. Results are shown in Table V.

TABLE V

RANK CORRELATIONS BETWEEN TEACHERS' JUDGMENT OF EXTENT OF IMPROVEMENT
AND OBJECTIVE MEASURES OF CHANGE DURING PROGRAM

Dimensions Compared	Correlations by Group*	
	Education	Psychotherapy
Teacher Judgment of Academic Achievement and:		
Wechsler IQ	-.33	<u>.44</u>
Stanford Achievement Battery Median	.22	<u>.59</u>
Examiner's Estimate of IQ	.13	<u>.66</u>
Teacher Judgment of Social-Personal Adjustment and:		
Nineteen Factor Personality Test	.33	<u>-.56</u>
Teacher Judgment of Communications Skills and:		
Need for Communication	-.15	.41

* Underlined correlations are significant at $p \leq .20$ - all but one are significant at $p \leq .05$

Note that these results do not indicate whether change was significant in magnitude but rather indicate the agreement between teachers' judgment of the relative rank in magnitude of change on these global characteristics and the rank in magnitude of change established by objective measures.

The results indicate that there is significantly high agreement between teachers' judgments and test results for four out of five measures of the psychotherapy group but for none on the education group. In the latter case teachers' ranking of overall academic achievement was negatively correlated with scores on the Wechsler but there was agreement between their ranks on personal adjustment and the examiners' rankings summarized in the Nineteen Factor Test.

The agreement between teachers' judgments and formal measures for the psychotherapy group is probably accounted for by the fact that a planned attempt to keep the knowledge psychologists gained from their work with patients in psychotherapy out of the hands of the teachers was abandoned early in the program. The practical nature of the program made it clear teachers ought to have all information about patients available if they were to be most effective. Thus, the teachers

actually knew the psychotherapy patients better than the education patients and this knowledge apparently led to significant agreement between them and objective measures of change in these patients.

This agreement, however, did not translate itself into an empirical observation of differences between groups on the magnitude of change. Regardless of the extent of agreement with formal tests, teachers' judgments of change indicated they found no significant differences between the education and the psychotherapy groups in the extent of change on academic achievement, communication skills and social-personal adjustment. The mean ranks are shown in Table VI. These judgments, then, were either less sensitive to changes measured by the formal tests, some of which showed significant differences, or they did not take the same dimensions into account.

TABLE VI

TEACHERS' RANKING ON CHANGE DURING PRE-VOCATIONAL TRAINING PROGRAM
BY EXPERIMENTAL GROUPS

Dimension	Group		Difference	
	Education (N-12)	Psychotherapy (N-12)		
	Mean Rank	Mean Rank	Mean Rank	U*
Academic	10.33	14.67	4.34	46
Social-Personal	12.08	12.92	.74	67
Communication	10.75	14.25	3.50	51

* Probabilities are greater than .10

Implications of the Results of the Pre-Vocational Training Programs

The results of the pre-vocational training programs, summarized in Table IV, present a pattern remarkably consistent with hypotheses drawn from personality and clinical theory.

The control group, some of whom were transferred to the institution at the beginning of the program, got no attention from the project staff except that inadvertent to the periodic testing procedures. They were informed about the program by their deaf peers. That their personal adjustment became poorer during the eighteen months is hardly surprising. They manifested an increase in transient personality disturbances, became more depressed, were more overtly hostile and showed a loss in general adjustment. The reliability of their general communication decreased and their need to communicate with others decreased. Intellectual functioning became poorer. This group did show improvement in

reading which is probably a chance result or at least will be so considered here since there appears to be no means to account for it. Generally, then the control patients present a dismal but predictable picture of a group transferred to an institution with a special program for them and then excluded from participation. It is indeed fortunate that the program is continuing and these patients are now included.

The education group showed no change in academic achievement or general adjustment but there was significant improvement relative to all other patients in several areas and there were no losses on the dimensions measured. These patients improved in intellectual function and increased their need to communicate with others. They became less depressed, decreased in both overt and latent hostility, had less overt anxiety and had less transient personality disturbances. Teachers rated them as improved academically as well as in communication skill and in personal-social adjustment. There were no dimensions on which this group changed for the worse. This group then improved in a number of areas and that change can be attributed to the effect of the education program in which they participated. Recall the goals of this program explicitly were to improve patients' personal-social adjustment and communication skills as well as academic achievement. Much of the academic work was directed toward improved responsiveness to and interaction with the environment including telling of time, reading enough to recognize important signs such as street names, making change and understanding the use of money. Academic achievement tests are not geared to this level of comprehension which doubtless accounts for patients' failure to show change on these tests while showing improvement in teachers' judgments reflecting change in areas more directly relevant to the education program goals.

The psychotherapy patients also changed on a number of dimensions. In general these improvements paralleled those of the education group but the changes were smaller in magnitude. There were instances of loss or greater impairment on some personality dimensions. Both the smaller changes and the personality changes can be best accounted for by clinical-personality theory.

The therapy group improved in intellectual function and arithmetic achievement. They showed a greater need for communication and a diminished degree of depression. On the other hand, they became more overtly hostile and manifested more transient personality disturbances. The reliability of their general communication was less over time and their general adjustment was rated as somewhat poorer than initially. These changes are appropriate for a group of patients in psychotherapy - a process wherein patients often "get worse before they get better." In other words, "uncovering psychotherapy" often involves at the outset a weakening of the patient's defenses and results in increased emotional disturbance which is transient. Depression is a reflection of repressed hostility but as it yields to therapeutic intervention, depression decreases and hostility is expressed on a more overt level where it can be dealt with directly. Accompanying the decrease in depression and the increase in overt hostility there is usually a move toward more association with the environment which here is reflected by the patient's greater need for communication. All of these personality changes would also be expected to temporarily impede the increment in intellectual function and educational achievement of this particular group because of the energy going into the

personal reorganization occurring. Clinicians would view these personal reactions as necessary precursors of improvement and expect that in the long run these improvements would be more permanent and of greater magnitude. This prediction could not be tested at the close of the project. However, presumptive evidence which supports the possibility was available in the work of Hutt and Feuerfile on the development of a measure of perceptual adience-abience which was done in conjunction with the project.¹⁵

Hutt has proposed that the basic modes in the expressive aspects of adaptation to the individual's world of reality (approach-avoidance) have a parallel on the perceptual level which he calls adience-abience. It is defined in terms of the relative tendency to approach relevant stimuli and deal with them integratively and adaptively in comparison with the tendency to withdraw from such relevant stimuli. He further hypothesizes that a measure of this dimension derived from the Bender-Gestalt Test is significantly related to motivation for behavioral change and to actual and available ability to change in the direction of greater personal, social and cognitive maturity. The adient (approach) pattern would be found in a person who is actively coping with the world and in some sort of relationship or contact with it. The abient person would be more withdrawn, hopeless and unrelated to the world and less able to distinguish himself from it. The key consideration is that an aggressive reaction is an adient reaction and in many situations may seem more actively disturbed. On this basis it was expected that the psychotherapy group in this project might have been increasing in adience, and, as such, be moving in the direction of greater propensity for positive change even though it would not appear in measurements at the time the project was nearing completion.

The subjects in the various groups were scored for adience-abience at the initial testing and at the final testing and the extent of change was expressed in difference scores. The more positive or higher the score, the more adient or change in direction of adience, i.e., coping behavior. Results are given in Table VII.

The differences between groups are not statistically significant but the expected trend is evident within groups. The psychotherapy group showed almost three times the change toward adience that the education group showed while the control group became slightly less adient. The fact that the education group did increase in adience probably reflects the therapeutic effect of the education program per se. The additional increment seen in the psychotherapy group is attributable to the impact of the therapy experience.

¹⁵ Hutt, M. L. and Feuerfile, D., "The Clinical Meaning and Predictions of a Measure of Perceptual Adience-Abience for a Deaf-Retarded Group." American Psychologist, July, 1963. Abst.

TABLE VII

CHANGE IN ADIENCE-ABIENCE SCORES DURING TRAINING PROGRAM				
Groups	Number	Time One Mean Score	Time Two Mean Score	Mean Difference Score
Education	11	- 1.36	- .18	+ 1.18
Psychotherapy	10	- 1.50	1.60	+ 3.10
Control	8	- 2.75	- 3.12	- .38

Vocational Program

There were fifty-eight patients who participated in the project in some way during the final year. Of these, twenty-five were most appropriately placed in the academic program. Most of this group were under fifteen years of age but seven were simply not able to communicate well enough without this training prior to attempts to work in one of the vocational programs.

There were thirty-three patients who participated in one or more of the vocational programs. A summary of their participation is given in Table VIII. Note that most patients started their vocational careers in the sheltered workshop and about half of those who started there remained in that placement at the end of this project.

TABLE VIII

SUMMARY OF MOVEMENT IN VOCATIONAL TRAINING PROGRAMS				
Program	Number of Entries		Last Location	
	Began Here	Moved Here from Another Location	Discharged	Remaining in Institution
Sheltered Workshop	25	0	3	13
Institution Work	1	5	0	4
Community	<u>7</u>	<u>6</u>	<u>6</u>	<u>7</u>
Total	33*	11	9 ¹	24

* Number of individuals in vocational placement of some kind.

¹ One patient, not included in this table, who was in the control group of the educational training phase of this project was taken home by his parents.

Eleven patients moved from one vocational program to another and with one exception these were all from the sheltered workshop. The direction of movement was from the workshop to the community or to the institutional work program rather than through the workshop to the institutional program to the community. In other words, training received in the sheltered workshop led to selection of appropriate placements for patients without further hospital work training. Some were found best able to perform at the relatively protective and supervised level of the sheltered workshop and remained there and those who left were often identified at that time as ready for the more responsible community placements.

The thirteen patients in community placement included three who were in the original education group, and seven who were in the psychotherapy group. Community placement in a work setting does not require the patient live off the institution's grounds which accounts for the seven patients working in the community but living at the institution.

This fact brings out one of the problems in vocational training programs which is especially troublesome at institutions located in relatively small cities. Work placements for the deaf-retarded are relatively few and such positions as are available in industry, odd jobs, maintenance, or as domestics are competed for by many patients at the institution. Deafness, in addition to retardation, does not enhance the competitive position for this group. A full-time person who locates work placements, supervises patients in these placements, and works with potential and actual employers is a necessity for a program of this kind. Such a person was sought for this project but it was not possible to fill the position and work placements had to be handled by the already busy institution work placement staff. At the close of the project there were six additional patients at the institution considered ready for work in the community but for whom placement had not yet been located.

Placement of women patients often poses some complications. They were not included in the sheltered workshop group because of the nature of the piecework and, more important, because in attempting to help these patients achieve an understanding of the work role it was believed most appropriate to define man's work and woman's work as a part of the distinction in the social roles of male and female. This decision may have been a mistake since much of the piecework could have been done by women and, in fact, is done by women in the local industries.

Whether the decision to reinforce and enhance the self-image of these patients in preference to giving the women an additional work opportunity was the best decision can't be assessed here. It did pose problems in finding work opportunities for the women patients such that only three of ten could be placed compared to thirty of thirty males. All three of these placements of women were directly in the community as domestics.

Local facilities were of considerable help in moving some patients out of the institution. The Michigan Association for Better Hearing, Michigan School for the Deaf, Goodwill Industries and the League for the Handicapped all participated in this way and were responsible for work placement of five of the thirteen community work placements either in their own programs or elsewhere.

The sheltered workshop accounted for the majority of work placements of patients in the project for two major reasons. First, it was available at the institution and assignment to it could be readily made. Second, most of the patients were capable of working there once they had the basic training given in the education program and in some instances the additional psychotherapy useful in helping them to participate in group situations. Details of the evaluation of this program are reported below.

Placements in the institution work program and in the community are more difficult to evaluate in an objective way but one crucial observation is possible. Those patients placed in community occupations who remain in them can be presumed successful. Often the work placement is accompanied by a living placement. In these instances patients are followed by the Social Service Department of the hospital until such time as they are discharged from the hospital books, a formal procedure following placement in a living situation in the community. Formal discharge is usually made after one year of successful living outside the institution although this is not a requirement. There were nine deaf-retarded patients discharged from the institution, six of whom were in community work placements at the time of discharge. The other three left directly from the sheltered workshop for discharge. One patient returned to the hospital and this return was necessitated by an inadequate living arrangement rather than a failure in adjustment on his part. A second placement was planned as soon as suitable accommodations could be found.

Most patients do not work full-time in their work placements which increases the importance of the living accommodations found for them when they are to live off the institution grounds. Where this can be accomplished the potential for work placement is greater since patients can live in their home community or, at least, there is no necessity to place them in Lapeer, the city where the institution is located.

Two patients who left the institution did not go into vocational placement proper but were enrolled in training programs through the cooperation of the project staff and community agencies conducting the programs. Both these patients were only mildly retarded. The project's major contribution in addition to identifying them was to help them communicate and to seek out appropriate places for them to live and progress toward a vocation following their training in the project.

The planned formal ratings of the patients' performance in vocational placement other than the sheltered workshop could not be carried out because of failure to fill the staff position for a person to contact and obtain these ratings from the various employers involved.

The fact that only six patients were placed in the institution work program can be interpreted in several ways. It is possible that the institution staff found them less capable or more difficult to work with relative to the other patients at the institution, and therefore did not place them. It is possible, but unlikely, that they were not only less capable than other patients but actually could not perform the required tasks. It is possible, and it seems most reasonable to conclude that the institution's work program was bypassed by this group of patients. Those who were capable of less closely supervised work were moved directly to the community which was considered the primary goal of the project for those patients capable of achieving it. By concentrating on this goal, it was possible to locate homes and work with patients so that community work could supersede institution work. The sheltered workshop was the appropriate situation for the patients not capable of less supervised employment and/or living. It should be pointed out that some patients were participating in more than one vocational program concurrently because not all community placements were full-time. However, since work in the open community was considered the greatest achievement, all patients who got to the community work level are counted in the summary of results. These part-time workers in the community included both patients still institutionalized and patients who were living outside the institution.

Evaluation of Sheltered Workshop

The sheltered workshop became the keystone of the vocational program. From here selected patients went to other forms of work placement. Here less capable patients had the opportunity to perform meaningful work, earn a small remuneration and fill part of their day with activities appropriate for adults. The maintenance of patients in this setting and movement from it to a more advanced work situation are both indications of its value. However, it was also possible to obtain certain formal objective measures of its effects.

Work production is one of these although it is not entirely satisfactory. Patients were in the workshop three hours a day, five days a week. During a ten week time period, they completed repair of 1,992 lamps and packaged them for return to Goodwill Industries. Piecework consisted of three commercial assembly jobs for an independent contractor building heaters for auto manufacturers. Over 40,000 very simple assemblies were completed during a six month period. Approximately one hundred wheel brackets were cut and drilled for a tractor builder by two capable patients.

These production figures are only used to give an indication of the volume of piecework which can be produced by severely handicapped patients. They do not reflect capacity of the workshop. They do indicate that the work done was satisfactory to the industries providing the parts and most important, they underline the requirement for a continued, organized search for work to be done in this type of setting.

A few patients, once they have learned the task, will produce simple work tasks at a very high rate and the workshop supervisor will be confronted with no work for his patients unless a large supply is scheduled into the institution.

The major purpose of the workshop is for patients rather than production. If it were the latter, supervisors would have to select patients, even if only coverally. It could be predicted that productivity would supplant other goals if there were pressure to keep up with demand. In short, in planning the sheltered workshop, the opposite dangers of pressure for production and idleness of patients will have to be carefully balanced when piecework is sought.

Insofar as habilitation is concerned, effectiveness of the workshop is best measured in terms of the changes in individuals placed there. These changes were measured for this program by one of four simple work sample type tests and two paper and pencil matching tests, constructed for the project. Only one of these tests, extension cord assembly, was a task taught directly during the workshop program. These tests were administered at the time a patient was placed in the workshop and again six months later. All tests were timed and scores consisted of time to complete the task correctly or number correct on the matching test. Mean scores for this group were compared on each test and significances of the differences in scores were tested. Results are given in Table IX.

TABLE IX

COMPARISON OF WORK SAMPLE TEST PERFORMANCE BEFORE AND AFTER WORKSHOP TRAINING					
TASK	N	RESULTS			
		Mean Rate		t	p
		Time One	Time Two		
Bolt assembly*	13	49.9	47.0	3.02	\leq .01
Disassembly of bolts*	11	30.3	27.2	5.10	\leq .001
Sort by color*	20	5.3	4.2	5.39	\leq .001
Extension cord assembly*	18	60.9	52.0	3.09	\leq .01
Total recognition /	20	4.8	5.0	.41	\leq .65
Lamp part recognition /	20	3.4	4.1	1.01	\leq .30

* Score = time in minutes

/ Score = number correct answers out of ten

There was a significant improvement in all tests which required working with the hands but not in the tests which were in paper and pencil form. It is interesting to note that the extension cord assembly which involved putting plugs and sockets on five extension cords and which was a part of the work patients carried out, improved to a significant extent but that ability to recognize the printed name of lamp parts and match them to pictures of the parts did not improve. Further, note that a perfect score on the latter test was ten and the group mean on final testing was less than half the possible score. Tool recognition was tested in a similar way and with similar results. The more intellectual tasks involving reading remained very difficult for these patients but the practical tasks showed the influence of training in the workshop. Further, the effects transferred to other hand tasks for which no opportunity for training was given.

Some of these patients never learned to handle the competitive aspects of the situation. When they observed others doing more or having less trouble than they did, their response was annoyance and often an argument with the better performer followed. This characteristic was sufficient to rule a patient out for consideration for placement in a community situation although it was a rule rarely invoked. Patients with this problem almost always had other characteristics which, all considered, made them unlikely to be happily placed outside the sheltered workshop.

Vocational Testing

Aptitude tests selected for the data bank began during the last phase of the project were chosen for their usefulness in identifying criteria for predicting job success by deaf-retarded patients. As stated previously, it was not expected that these criteria could be isolated in the project period because of the limited time for patients' vocational placement and follow-up. Rather the plan was to begin an extensive testing program in which measures could be accumulated over a time - the data bank. From this, indices can possibly be identified which are predictive of success or failure in vocational placement.

The tests finally used can be divided into three categories: intelligence and reasoning, vocational aptitude and motor development. Table X gives the average scores obtained by the patients in this deaf-retarded population and for a second group as similar to the deaf as could be located in the test literature. Note that in general, the deaf-retarded perform well below the comparative population on all tests but this expected finding is relatively less important than the overall compilation of test results which can serve as the beginning of a standardization population for the institutionalized deaf-retarded which, in turn, can be reflected against the outcome of vocational placements.

TABLE X

RESULTS ON DATA BANK MEASURES

Test	Scores by Populations					
	Deaf-Retarded			Standardization Group*		
	Number	Mean	Standard Deviation	Number	Mean	Standard Deviation
<u>Intellectual Function</u>			<u>Deaf pupils in a public residential school.</u>			
WAIS Performance						
IQ	45	68	14.3	85	101.8	14.5
Object assembly	47	7	3.12	87	11.15	Not given
Block design	47	6.2	3.19	87	11.14	" "
Picture arrangement	45	3.5	2.81	87	10.91	" "
Picture comprehension	40	5.2	2.88	87	10.88	" "
Digit symbol	35	3.5	2.62	87	8.89	" " (a)
Chicago Non-Verbal Exam			Test manual describes 56 as "mentally defective." <u>Farrant's deaf and hard-of-hearing group.</u>			
Pantomime standard score	45	56.2	29.8	120	99.43	11.94 (b,c)
Raven Coloured Progressive Matrices			Manual shows 22 to be in 25th percentile when compared with British child, aged 10. <u>Farrant's deaf and hard-of-hearing group.</u>			
Total score	51	22.1	6.74	120	25.50	6.15 (d,c)
<u>Vocational Aptitude</u>						
Crawford Small Parts Dexterity Test			Deaf-retarded, Part I, mean is less than first percentile. Deaf-retarded, Part II, mean is equal to fifth percentile. <u>Unselected male adult guidance center applicants.</u>			
Part I (time in minutes)	33	10.2'	4.1	546	5.3'	1.3
Part II " " "	33	12.08'	3.5	546	8.8'	2.2 (e)
Minnesota Rate of Manipulation			Scores falling at the first percentile level for the <u>general population.</u>			
Placing (time in seconds)	34	177.1"	56.5	147"		
Turning " " "	34	174.8"	66.5	121"		
Displacing	34	141.1"	46.2	110"		
One-hand turning and placing	34	212.1"	56.1	189 (f)		
Two-hand turning and placing	34	143.2"	51.6	109"		
Minnesota Spatial Relation			In terms of the decile norms for junior and senior high school boys, the deaf-retarded mean falls in the lowest decile, 0-9, ages 11-18. In terms of general population of males, the deaf-retarded mean falls somewhere in the lower end of the interval between seventh and thirtieth percentile (1428" to 1934").			
Total time in seconds	34	1839"	782.4	(g)		

Table X (continued)

Table X (continued)		Scores by Populations				
Test	Deaf-Retarded			Standardization Group		
	Number	Mean	Standard Deviation	Number	Mean	Standard Deviation
Pennsylvania Bi-Manual Worksample				<u>Unselected sampling of males between ages 16 and 39.</u>		
Part A (time in minutes)	32	14.8'	6.0	Part A time of 7'21" was less than 2.3 percentile.		
Part D " " "	32	7.3'	2.8	Part D time of 4'03" was less than .62 percentile. (h)		
Bennett Hand-Tool Dexterity				For a sample of male adults at a vocational guidance center a time of 12'47" was less than the first percentile. (i)		
Total time in minutes	24	14.5'	4.3			
<u>Motor Function</u>						
Lincoln-Oseretsky Motor Development Scale	21	56.0	23.4	For boys and girls, age 7, the deaf-retarded mean falls at the 65 percentile. For boys and girls, age 10, it falls at the sixth percentile. (j)		

* See:

- (a) Psychology of Deafness. Myklebust, H.R. New York: Grune and Stratton, 1964, pp. 72-3.
- (b) Manual of Directions for Chicago Non-Verbal Examination. Brown, A.W. New York: Psychological Corporation. 1956.
- (c) "The Intellectual Abilities of Deaf and Hearing Children Compared by Factor Analyses," Farrant, R.H. Am. Annals of the Deaf, Vol. 109, No. 3, May, 1964, pp. 306-325.
- (d) Guide to Using the Coloured Progressive Matrices. Raven, J.C. Scotland: Grieve & Sons, Rev. 1963.
- (e) Manual for Crawford Small Parts Dexterity Test. Crawford, J.E. and D.M. New York: Psychological Corporation, Rev. 1956, Tables 1a and 2a.
- (f) Examiner's Manual for Minnesota Rate of Manipulation Test. Minneapolis: Educational Test Bureau, American Guidance Services, Inc. Rev. 1957.
- (g) Examiner's Manual for Minnesota Spatial Relations Test. Trabue, M.R., Paterson, D.G. and others. Minneapolis: Educational Test Bureau, American Guidance Service, Inc. (nd)
- (h) Examiner's Manual for Pennsylvania Bi-Manual Worksample. Roberts, J.R. Minneapolis: Educational Publishers, Inc., 1943.
- (i) Manual of Directions for Hand-Tool Dexterity Test. Bennett, G.K. New York: Psychological Corporation. 1947.
- (j) Manual for Lincoln-Oseretsky Motor Development Scale. Sloan W. Chicago: C.H. Stoelting Co. (nd)

Table XI gives the results of such an analysis for the limited number of patients available at the present time who were participants in a vocational training program. Patients were divided into groups on the basis of the highest level of vocational placement they achieved during the year of vocational training. Those in the sheltered workshop only are considered as the lowest level of placement, institution work program is the next level and the community placements in a work setting were considered as the highest level. This somewhat arbitrary hierarchy is based on the goals of the project which imply that work placement in the community is a higher level performance than work in the institution work program. This is not so much because of the complicated nature of the work which may be no more or even less difficult than that in the institution work program but it does require an ability to participate in a situation where demands for behavior constraint and continued attention to work for a longer period of time are greater. The number of patients given in each group will differ from the number previously given in each type of setting since patients already placed were not included in the vocational testing program. Not all patients could be tested on all tests which accounts for the variability in the numbers shown in the table.

The results of this analysis are rather remarkable in the extent to which they follow the conventional classification into a hierarchy of difficulty of performance required in the vocational placement. In most instances the sheltered workshop group had the lowest mean score, the institutional work group the next and the community placements obtained the highest mean score. A few exceptions may be noted in the table which indicates instances where one of the three groups will be out of place in the suggested hierarchy. The Bennett Hand-Tool Dexterity test results were in reverse of expectation. While both the community placement group and the institution work group were small in number, the reversal cannot be accounted for solely on this basis and no explanation can be offered from the data.

When enough data have been accumulated, it will be possible to correlate subtest results on all these measures with objective measures of work performance as well as with level of placement. It appears from the data available at the present time that a number of the tests have potential as definitive predictors of success at definitive levels and types of work tasks.

Implications of Results of Vocational Training

In summarizing the results of the vocational program, it may be concluded unequivocally that deaf-retarded patients can be vocationally habilitated with training selected from a range of possibilities including academic, communication, job training, and psychotherapy. This training must be individually prescribed relative to realistic goals set for the patient on the basis of his assessed potential.

Problems in placing these patients are less those of training them than they are of locating suitable homes and opportunities in the community and of finding enough work to be done for institution based placements. These problems, however, should not be minimized for they are crucial if a vocational program is to be successful.

TABLE XI

COMPARISON OF RESULTS ON DATA BANK MEASURES BY VOCATIONAL PLACEMENT

Tests	Vocational Placement								
	Sheltered Workshop			Institution			Community		
	Number	Mean	Standard Deviation	Number	Mean	Standard Deviation	Number	Mean	Standard Deviation
<u>Intellectual Function</u>									
<u>Wechsler Performance</u>									
IQ	15	68.9	13.0	3	75.7	2.5	5	77.8	11.3
Object assembly	15	8.1	2.7	4	8.0	1.2	6	8.5	3.8
Block design	15	6.7	2.9	4	6.3	1.5	6	6.8	2.9
Picture arrangement	15	3.3	2.9	3	5.0	.8	5	4.8	2.3
Picture comprehension	14	5.0	2.9	4	3.8	2.5	4	5.8	2.8
Digit symbol	14	2.9	2.4	4	5.0	2.9	6	4.0	3.0
Chicago Non-Verbal	16	53.9	28.3	4	66.7	26.3	6	70.3	21.6
Raven Progressive Matrices	16	24.2	5.8	4	26.5	3.8	6	24.2	5.2
<u>Vocational Aptitude</u>									
<u>Crawford Dexterity</u>									
Part I (in minutes)	14	9.98	3.20	4	7.81	1.72	6	10.22	6.74
Part II	14	11.35	2.97	4	11.27	3.17	6	12.54	5.37
Minnesota Manipulation									
Placing (in seconds)	13	183.5	62.5	4	169.3	67.0	5	148.4	42.3
Turning	13	175.2	70.6	4	169.7	50.7	5	140.4	50.1
Displacing	13	138.5	36.9	4	121.3	39.4	5	121.8	39.2
One-hand turning and placing	13	217.3	61.7	4	184.5	16.6	5	186.6	51.8
Two-hand turning and placing	13	140.6	52.0	4	158.5	50.1	5	117.2	43.7
Minnesota Spatial Relations	13	1520.3	461.4	4	1640.3	636.5	5	1492.2	623.4
Pennsylvania Bi-Manual									
Part A (in seconds)	13	843.8	236.8	4	836.0	121.8	4	639.3	142.3
Part D	13	430.3	116.4	4	356.8	44.8	4	309.5	119.0
Bennett Hand-Tool Dexterity Test (in min.)	13	13.38	3.68	4	13.78	1.11	3	15.16	3.29
<u>Motor Function</u>									
Lincoln-Oseretsky Motor Development	7	64.7	16.1	3	57.3	3.3	4	70.8	9.8

Further, carefully designed, research will be necessary to enable the most adequate and economical prescriptions from several types of training tested in this project. All patients had a rather complete program of educational training so differential effects of various levels of education on the overall goal can't be precisely parcelled out. Psychotherapy will need further evaluation to determine whether the predicted long-term effects do in fact occur and, indeed, to define what it is for the deaf and retarded.

Vocational placement was hampered by lack of opportunities both inside and outside the institution and there has not been enough time lapse to determine whether placements in any of the work programs persist. When it has been obtained, this information joined with that from all parts of the project will enable more precise selection of training for each deaf-retarded patient.

Can patients be placed in work situations without any of the training used here? No control patient was, but it seems probable it could be done. Can patients be vocationally habilitated when habilitation refers to social-personal adjustment and accumulation of basic skills in communicating with others, understanding the signs and signals necessary in the world outside the institution and in performing above the most routine level of work? Clearly "yes" for many patients with appropriate training. This distinction is evident from the study of this particular project even though much specificity remains to be developed from the base presented here.

Nevertheless careful scrutiny of the data presented in this report should make it clear that a group of deaf-retarded patients are severely handicapped in terms of their potential for independent living and vocational placement in the open community. It would be a serious overstatement of the case to imply an optimistic expectation for training programs for this group. When all is said and done the main effects of a training program such as the one discussed here are improved communication skills and a somewhat better life situation for patients most of whom will remain in the institution.

FUTURE OF PROGRAM

The implications, suggestions and program revisions which have come from careful analysis of the results of this habilitation project have great likelihood of implementation in a continued program. During the final year of the grant-aided project, the Michigan Legislature appropriated funds to carry the program forward at Lapeer State Home and Training School and the Department of Mental Health designated that institution as the center for deaf-retarded training for the entire state. Patients entering other training schools who are identified as deaf in addition to their retardation are transferred to Lapeer for comprehensive diagnosis and training. A separate building has been designated as a residential building for the males, age ten to twenty; a direct result of the conclusion of the project staff that more comprehensive and continuous programs including specialized environment of their total milieu was essential if training were to be fully productive. The deaf-retarded population which cannot be accommodated in the residence programs will participate in a program with the same goals as were sought in this project. It is planned that there will eventually be a residence for the deaf girls.

The program will continue to have a professional staff trained in working with both the retarded and the deaf. An educator is to be the program administrator and he is assigned full-time to planning, administering and coordination of the program. The team, in addition to the manager, will consist of four teachers, a psychologist, a social worker, recreation worker, nurses, attendants and part-time service from a member of the Work Placement Department. Attendants in this cottage will participate in a training program which will help them to understand the particular problems of the deaf and means of communicating with them. Two speech and hearing therapists have been added to the permanent staff and one will carry on the diagnostic work while the other will be responsible for a new auditory rehabilitation program begun recently to help the hearing impaired to learn to use and care for hearing aids.

There are other extensive changes occurring in the institution's total program which include energetic attempts to find housing and/or employment for large numbers of the population who will benefit from such placements through a U. S. Department of Labor grant. The deaf-retarded will be incorporated into these plans. In addition, the sheltered workshop which was established as a part of this project will be enlarged to include greater numbers of deaf-retarded as well as other kinds of patients and a wider variety of work activities will be incorporated. Girls as well as boys will participate.

Finally, retarded deaf or hard-of-hearing who are not institutionalized will obtain diagnostic service through the hospital's outpatient program and may join the sheltered workshop groups on a day care basis.